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The Speed of Response to a Stimulating Dose of Tetanus Toxoid in Individuals Actively Immunized Four or More Years Previously: One hundred and forty-five children, basically immunized with alum-precipitated or aluminum hydroxide absorbed toxoid, were given recall injections from 6 months to 7 years later. The speed of the secondary immune response was measured by titrations of serum antitoxin during the subsequent week. It was observed that (a) all children responded by the sixth day, (b) recall injections of fluid toxoid exerted a more rapid response than did recall injections of A-P toxoid regardless of the time interval, and (c) the passage of 4 years or more significantly delayed the response only in those children carrying low titers who were given recall injections of A-P toxoid.

Thirty-two adults, basically immunized with either fluid or A-P toxoid, were given recall injections from 2 to 5 and 1/2 years later. The secondary immune responses elicited were slower than those observed in children regardless of the type of toxoid used for recall. Two adults exhibited no response by the sixth day. There was no correlation between the duration of the lapse of time since the last previous injection and the speed of response.

Forty-three rabbits and 3 monkeys, previously actively immunized against tetanus, were studied to determine the effect, if any, of simultaneous injections of heterologous (horse) antitoxin and toxoid. Both fluid tetanus toxoid and A-P tetanus toxoid in doses of 0.05 or 0.1 ml. were used. Commercial tetanus antitoxin was employed in a dose of 150 units except under (c) below. It was found that (a) when these doses of antitoxin and toxoid were injected into opposite extremities, the initial increase in titer due to the injected antitoxin was followed in from 3 to 6 days by a higher and prolonged secondary increase. This latter could only be a true secondary immune response, (b) when toxoid and antitoxin were mixed in the same syringe no response occurred, (c) increasing the dose of injected antitoxin 3.3-fold led to higher initial titers and did not suppress the secondary immune response, and (d) the addition of hyaluronidase to the toxoid did not speed the secondary immune response but appeared to increase the total amount of homologous antitoxin produced by the animals.

Four previously immunized individuals, 2 children and 2 adults, were studied following accidental wounding. They were injected with the usual prophylactic dose of tetanus antitoxin and, in the opposite extremity, tetanus toxoid. Following initial increases in titer due to the antitoxin, 3 of the 4 demonstrated secondary immune responses from 4 to 5 days later.

Because rapidly fatal tetanus following very short incubation periods has been described in immunized individuals, because in children a lapse of 4 years or more subsequent to immunization may delay the secondary immune response to toxoid, and because in adults the secondary immune response may not occur by the sixth day, the simultaneous injection of both prophylactic

antitoxin and a booster of toxoid is advised when severe wounding occurs. (Proj. No. NR 131 375, Final Report, Stanford Univ. School of Medicine, Dept. of Pediatrics, San Francisco, Calif., 25 Aug. '49, J. J. Miller, Jr., Proj. Supervisor)

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An Evaluation of Human Serum Albumin in the Treatment of Cirrhosis of the Liver: This study was undertaken to determine the effect of concentrated salt-poor human serum albumin on ascites and edema in chronic liver disease when administered in sufficient amounts to raise the serum albumin concentration and maintain it at or near normal over long periods of time.

Twenty-nine patients were selected who had marked evidence of hepatic cirrhosis by history, physical examination, and liver function tests, and who had ascites, edema, and hypoalbuminemia. In a few patients the diagnosis was confirmed by liver biopsy or at post-mortem examination. In most instances patients were chosen in whom there was no response to other forms of therapy. In the majority of cases, the need for repeated paracenteses was established before treatment was initiated. During the period of study no other therapeutic agents were given except for a nutritious diet which the patients were urged to eat. A few patients were given mercurial diuretics at infrequent intervals with only a temporary effect on the course of their fluid retention. The salt-poor concentrated (25 percent) human serum albumin was given intravenously, diluted with an equal volume of 5 or 10 percent dextrose solution. Quantities of albumin necessary to raise the serum albumin concentration to between 3 and 4 grams per 100 cc. varied; usually from 50 to 100 grams daily were given over a period of from 5 to 10 days with the majority of patients receiving 75 grams per injection. Thereafter the serum albumin was given in amounts of 75 Gm. once, 50 Gm. twice, or 25 Gm. 3 times weekly. If marked improvement in ascites was not observed during the first 10 days of treatment, maintenance injections were continued for from 3 weeks to 8 months. In 3 patients the effect of a low sodium diet was studied during albumin therapy.

Abdominal paracentesis was performed as necessary and whenever possible the protein concentration was determined on the fluid obtained. The serum protein concentration and albumin and globulin fractions were determined at weekly intervals, total protein by micro-Kjeldahl analysis and albumin and globulin separation by Howe precipitation. Serum thymol turbidity and serum bilirubin were determined at weekly intervals. The percentage of bromsulphalein retention, 45 minutes following a 5 mgm. per kilogram dose, was determined at less frequent intervals. Most of the patients were weighed daily and frequent abdominal girth measurements were made. The latter were found to correlate well with weight gain and ascites formation.

The use of concentrated albumin in the treatment of edema and ascites associated with hypoalbuminemia has been viewed with optimism on theoretical

grounds. Encouraging results were obtained by Kunkel early in the study of its use in cirrhosis of the liver but the results of Thorn et al., and Patek et al. have borne out the original conservative estimate of its value made by Janeway and his co-workers. The series reported here reveals that a wide range of results may be obtained even when patients are treated over long periods of time. Although striking improvement was seen in a few patients, the relatively poor effect on 11 out of 20 patients studied (not including nine patients on whom the effect of albumin could not be satisfactorily evaluated) leads to a similar conservative estimate of the efficacy of albumin therapy in chronic liver disease. The fact that some patients in this series improved after the prolonged administration of albumin suggests that such improvement may have been the result of dietary treatment alone. Furthermore, because it has been shown that albumin administered intravenously can be utilized as a protein nutrient, some benefit was undoubtedly derived from this nutritional effect of albumin. However, albumin is neither a specific for the treatment of the fluid retention nor the underlying liver disease.

The most economical use of albumin is obtained when the diet is low in sodium because the formation of ascitic fluid and loss of protein is greatly reduced by this means. This is in disagreement with Armstrong who has minimized the importance of a low sodium intake in the treatment of liver disease. As the data presented here indicate, the removal of ascitic fluid containing 300 grams of protein may involve the waste of between 100 and 200 grams of albumin. A high intake of salt and water increases the formation of ascites. If ascitic fluid is present in large quantities or is rapidly forming, the entry of albumin into the fluid drains protein from the serum in larger quantities than would be the case were ascitic fluid present in small quantities or its formation diminished by measures such as sodium restriction. Furthermore, to maintain a given serum albumin concentration, less albumin is required when its loss into ascitic fluid is minimized by reducing the rate of formation of ascites. A low sodium diet is of most benefit to those patients who require repeated paracenteses. However, when albumin therapy is being initiated in a case of anasarca, a diet low in sodium should yield the most efficient use of albumin, regardless of the final response.

The mechanism by which concentrated albumin induces a diuresis is not clear. Albumin administration undoubtedly increases the serum osmotic pressure. Evidence suggesting that this is an important factor is the observation of Thorn et al. and substantiated here, that peripheral edema is most easily mobilized when therapy is begun. The importance of the osmotic factor is minimized, however, by the finding of increased concentrations of protein in the edema and ascitic fluid when albumin is given intravenously. The increase in ascitic fluid protein thus produced would appear to emphasize the importance of portal hypertension as a causative factor in ascites formation. It should be pointed out, however, that the passage of protein into ascitic fluid following

intravenous albumin took place even in patients undergoing a rapid diuresis. It seems likely that factors in addition to lowered serum osmotic pressure and portal hypertension are operative in the retention of fluid in cirrhosis of the liver. Patek has shown in a limited series of studies that there is increased renal blood flow and glomerular filtration when albumin is administered, presumably resulting from the increased plasma volume. This may hasten salt and water excretion by the kidney. Further studies of renal function in cirrhosis both before and during albumin therapy are clearly indicated.

The occurrence of harmful effects from albumin therapy must be emphasized. Because a majority of patients with cirrhosis are over the age of 45, and are therefore subject to possible degenerative heart disease, it may be expected that a rapid increase in plasma volume such as is produced by albumin may result in cardiac complications. Finally, the augmented plasma volume following albumin administration may increase the burden upon esophageal varices and precipitate rupture and hemorrhage. Such an occurrence may have been the cause of death in 3 patients in this series. In view of such incidents albumin should be administered cautiously and efforts to raise serum albumin levels above normal are to be avoided.

The data were considered suitable for analysis in 20 of the patients of this series. Four patients had an immediate diuresis with loss of ascites and edema, 5 had a slow response in from one to 3 months, and 2 recovered from ascites and edema after prolonged treatment (6 months for one and 8 months for the other). Nine patients must be considered failures although the fluid retention was partially controlled in 3 by the use of a low sodium diet. The 4 patients who had immediate improvement had not required paracentesis before albumin therapy and had massive edema. Diuresis might have occurred subsequently in these patients from a nutritious diet alone. Nevertheless, albumin administration was effective by inducing an immediate, rapid diuresis, beginning before the serum albumin concentration reached normal. The slow response in 7 patients cannot be definitely attributed to the albumin administered as the other therapeutic measures used concomitantly might have given as satisfactory results.

Fatal hemorrhage from esophageal varices was coincident with, or shortly followed, albumin administration in 3 patients. Severe epistaxis and bleeding from a duodenal ulcer may have been induced by this therapeutic measure. Pulmonary edema and pleural effusions were observed as untoward effects, presumably attributable to albumin therapy. The use of this form of therapy, especially in elderly or cardiac patients, or in the presence of known esophageal varices, is dangerous and caution should be exercised.

Albumin entered the ascitic and edema fluid following its intravenous infusion whether diuresis occurred or not. The total protein content of the ascitic fluid rose in approximately direct relation to the rise in serum albumin.

During a given period between paracenteses in 5 patients the protein lost in the ascitic fluid approximated the amount of albumin administered intravenously. Ascitic fluid formation was found to be retarded by a low sodium diet in 3 patients, and thus the loss of albumin by paracentesis was reduced. Sodium restriction allowed the maintenance of normal serum albumin concentrations more economically than did a diet unrestricted in sodium. Serial serum bilirubin, thymol turbidity and bromsulphalein tests showed no consistent change during or after treatment with albumin. Recovery from ascites and edema was seen to precede the return of liver function tests to normal values.

It is concluded that concentrated salt-poor human serum albumin, under the conditions of this study, is neither specific for the relief of ascites nor markedly beneficial in the treatment concerned with the underlying liver disease. In view of the variety of results obtained with concentrated human serum albumin in patients with cirrhosis of the liver, it is concluded that other factors in addition to a reduced serum osmotic pressure, as represented by decreased serum albumin concentrations, are active in the retention of fluid. (J. Clin. Invest., July '49, W. W. Faloon et al.)

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Transplantation of Aortic Segments Fixed in 4 Percent Neutral Formalin: Although the authors have developed a method whereby blood vessel segments can be kept in a living state for 4 or 5 weeks and have demonstrated that these viable segments can be successfully used to bridge defects in the aorta (News Letter of 8 April 1949), the technic involves certain difficulties when it is employed for operations on human beings. First, the blood vessels must be secured in a sterile manner, within a few hours after the donor's death; this time factor alone cuts down to a great extent the available supply of vessels. Second, storage of the material must be supervised and performed by experienced and trained personnel. Third, the longest period that these live vessels can be kept and used safely is about one month, at the end of which time any unused vessels must be discarded. It has become obvious that a blood-vessel bank, preserving live segments of vessels, is not practical except in a very few clinics where much fresh autopsy material is available for supplying the vessels and where a large volume of cardiovascular surgery is being performed.

The authors are now seeking to develop methods whereby vascular segments can be obtained under nonsterile conditions, can be stored in a simple manner for long periods of time and can be used as satisfactory vessel grafts. To reach this goal it will be necessary to devitalize the stored vessels. If it could be shown that devitalized segments can be used to bridge arterial gaps successfully, it would then be possible for many hospitals or military establishments to keep on hand a supply of vessels which could be used whenever the need arises.

Formalin fixation of tissue was chosen for study because such treatment of a vessel obviously devitalizes it and because such fixation produces a vessel which is tough and strong. It is known that some satisfactory grafts have been carried out with formalin-fixed vessels in the past. The tissue utilized in this series of grafts was, however, prepared in a different manner than any reported in the literature. Segments of thoracic aorta from 2 to 10 cm. long were removed from donor dogs, freed of excess areolar tissue, and their branches ligated with 4-0 silk. These vessels were not obtained in an aseptic way. In most instances the segments were procured within from 2 to 3 hours after death of the animal, but in some the period was much longer than this. The segments were washed free of blood and fixed for from 2 to 25 days in a solution of 4 percent formalin in physiologic saline or in tap water. The solution was neutralized by adding an excess of commercial chalk or calcium carbonate (U.S.P.). In the latter part of the study the vessels were kept stretched over glass or plastic tubes while fixing them in the formalin. This served to maintain a lumen of desired size, to prevent wrinkling and to make a thinner wall which facilitated subsequent manipulations. Furthermore, such fixation over tubes allowed the vessel to be molded into a curved form when this was desired for certain types of grafts. Before implanting segments into recipient animals they were placed for periods of from one to 48 hours in a small volume of a buffered, complex solution at pH 7.6. On the operating table the segment was kept in several hundred cc. of physiologic saline for from one to 2 additional hours.

Formalin-fixed segments of aorta were implanted into 2 series of recipient animals. In the first group formalinized aortic grafts were inserted into the abdominal aortas of 10 mongrel dogs, weighing from 25 to 40 pounds. The abdominal aorta between the renal and inferior mesenteric arteries was chosen as the site of implantation so that the method of implantation would be uniform with other series of grafts carried out in the same laboratory. The grafts measured from 2 to 4 cm. in length, and each end was sewed into place by using a continuous, everting, mattress suture of 5-0 deknatel silk. The total time of aortic occlusion was generally from 30 to 45 minutes. No anticoagulants, intravenous fluids, or other special care was given postoperatively.

Vascular channels of satisfactory size resulted in all experiments. There was one instance of suture disruption (secondary to infection). Dogs have been kept as long as 9 months after implantation of such aortic grafts. The grafts showed no tendency to dilate even under the stress of forced vigorous exercise. The most disturbing changes that have been observed in these grafts were degeneration of the media (fragmentation of elastica and calcification). The formalinized segment appears to act as a framework, along which a new intima and adventitia is laid down by the host. The same type of preserved aortic segments have been used to enter and join with the ventricle in 60 instances in the production of extracardiac shunts in dogs; 45 of these survived operation and were observed for short periods of time. There was no

instance of thrombus originating in the formalinized segment, nor was there any rupture or calcification in this series. In animals observed for sufficiently long periods of time firm union could always be demonstrated between the formalinized vessel and the ventricular wall.

From these preliminary experiments it is believed that it might be possible to keep formalinized human aortic segments and use them in human subjects if circumstances demand the immediate bridging of an aortic gap and no other graft more suitable (such as a fresh one) is available. Although no final evaluation of this method of grafting can be made at the present time, the experimental observations to date justify additional studies to determine the ultimate fate of such grafts. It is a fact that when employed as grafts formalinized vessels do not stand up as well as fresh ones. Additional studies with other methods of vessel preservation are being carried out, with the objective of finding the one which would be most suitable for use in human beings. (Am. J. Surg., Sept. '49, E. C. Peirce, II et al.)

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Inactivation of Partially Purified Poliomyelitis Virus in Water by Chlorination: In previous investigations on the inactivation by chlorination of partially purified poliomyelitis virus (mouse-adapted Lansing strain) in distilled water, it was found that at a pH range from 6.85 to 7.4, the virus was inactivated within 10 minutes in all water samples with residuals consisting of free chlorine and chloramine. This result was obtained even with as little as 0.05 p.p.m. free chlorine. At a higher pH range (from 8.95 to 9.25) the antiviral action of chlorine was decreased. On the other hand, in water samples with residuals consisting only of chloramine (no free chlorine) the virus was usually inactivated in less than 2 hours by from 0.5 to 0.75 p.p.m. residual chloramine, although residual chloramine values of 0.2 p.p.m. or less failed to inactivate the virus.

This report concerns further experiments along the same lines in which representative samples of different natural waters were used instead of distilled water. In order to have a fairly wide variety of natural waters, 3 different lake waters, 2 river waters, and one well water were used in the present experiments. In contrast to the authors' previous experiments, in which the distilled water was sterilized by boiling, the natural waters were not sterilized. Instead, each sample of natural water was tested for safety by intracerebral inoculation into a few mice prior to the chlorination experiments. In addition, the water samples were examined bacteriologically.

Mouse-adapted Lansing strain of poliomyelitis virus was used. Essentially the same virus purification procedure as that described in the authors' publications was used, except that the sedimentation of the virus was carried

out at 40,000 r.p.m. (approximately 117,000 g.) for 2 hours instead of 3 hours. Virus preparations purified by one and 2 cycles of centrifugation contained, in the equivalent of a 10-percent suspension, an average of 0.049 mg. N/ml. and 0.017 mg. N/ml., respectively.

As in earlier work, 100 ml. portions of water were used, to which partially purified virus suspensions were added to make a 0.25 percent or a 0.5 percent dilution of virus. Chlorination was done by adding chlorine water. The samples were tested for virus content by intracerebral inoculation into white Swiss mice after contact periods of 10, 30, and 60 minutes. Simultaneously, with mouse inoculations, residual free chlorine and chloramine were determined by means of the orthotolidine-arsenite test. Because, in some instances, active virus was not detectable after 10 minutes' contact, in spite of the absence of free chlorine, the test for free chlorine was carried out after 5, 10, 30, and 60 minutes in most of the subsequent experiments. In order to stop the action of chlorine at the end of the contact period, from 1 to 2 drops of a 10-percent suspension of CNS tissue of normal mice were added to 2 ml. of sample just before injection.

In samples of natural waters having a pH range of from 7.9 to 8.3, the virus was consistently inactivated within 10 minutes in the presence of 0.05 p.p.m. residual-free chlorine at the end of this contact period. In many instances, but not always, the virus was inactivated by still smaller amounts of free residual chlorine. In experiments at a higher pH range (from 10.0 to 11.25), from 0.1 to 0.15 p.p.m. residual-free chlorine were necessary to achieve the same results. (Am. J. Pub. Health, Sept. '49, S. G. Lensen et al.)

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The Clinical Use of Urecholine in Dysfunctions of the Bladder: Urecholine (the urethane of beta-methylcholine chloride, also known as carbaminoyl-beta-methylcholine) is one of a group of choline esters that act primarily as stimulants of the parasympathetic nervous system. When administered in therapeutic dosages orally or subcutaneously there is little or no effect upon the heart rate, blood pressure or peripheral circulation of normal human subjects. The drug increases peristalsis and stimulates micturition. Starr and Ferguson suggested the use of urecholine in postoperative urinary retention and Winter, using a cystometrographic technic on unanesthetized dogs, showed that urecholine lowered the vesical capacity and increased the irritability of the bladder.

Urologists are often confronted with chronic urinary retention from hypotonic dysfunctions of the bladder without any evidence of mechanical vesical neck or urethral obstruction. There are also certain instances in which one is justified in feeling that vesical neck obstruction has been adequately removed by prostatectomy or other surgery, yet the patient continues to carry

residual urine. These situations may occur in patients who have a central nervous system lesion or a weakened detrusor muscle. It was with the thought in mind that perhaps urecholine might be of value under these circumstances that observations regarding the effect of the drug upon the human bladder were begun. Observations were made to determine, (1) effect of urecholine on the normal human bladder, (2) effect of urecholine on the human bladder exhibiting chronic hypotonic dysfunction, and (3) effect of urecholine on acute postoperative urinary retention in human beings. The immediate effect on the normal bladder and the bladder with chronic hypotonic dysfunction was determined by cystometrographic studies.

The observations made in this study indicate a powerful effect of urecholine on the normal bladder, the bladder showing acute postoperative urinary retention, and the bladder showing chronic hypotonic dysfunction from various forms of primary etiology. Although the drug is not effective in every instance, it would appear that it answers the need for an effective agent, free from severe side reactions, to decrease vesical capacity, increase vesical tone and contractility, and reduce residual urine in certain patients with chronic hypotonic dysfunction of the bladder.

The following methods of management are suggested: (1) for chronic hypotonic dysfunction of the bladder, give urecholine from 10 to 20 mg. orally every 6 or 8 hours. (The drug has been continued daily for as long as 3 months without evidence of harmful effect.) Test for residual urine every 2, 3, or 4 days until base line is reached. (2) For acute postoperative urinary retention, give urecholine from 10 to 20 mg. orally or 5 mg. subcutaneously. Repeat dosage if patient does not void within 30 minutes. Catheterize if second dose is not successful.

There are definite contraindications to the use of urecholine. Intramuscular or intravenous administration should be avoided as certain severe reactions may occur, characterized by such symptoms as headache, sweating, circulatory collapse, drop in blood pressure, abdominal cramps, diarrhea, shock, and in some instances bronchoconstriction. The antidote for such reactions is atropine. Urecholine should not be given to patients with a history or evidence of mechanical vesical neck or urethral obstruction. It is proper to rule out such possibilities by history and cystoscopic examination before beginning therapy.

It is believed that the particular field of usefulness of this drug, in the light of our present knowledge, lies in the management of acute postoperative urinary retention and in chronic hypotonic dysfunction of the bladder resulting from various forms of primary etiology. (J. Urol., Sept. '49, L. W. Lee)

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Inheritance of Electroencephalogram Patterns in Children with Behavior Disorders: It has been recognized for a number of years that the pattern of the electroencephalogram (EEG) of an individual may be related in some way to his behavior or personality. For, although there are no EEG patterns which specifically characterize individual psychological traits, Rubin and Bowman find a particular type of normal EEG in patients with peptic ulcer and, in the normal individual, the type of EEG pattern has been found to relate to his reflex status. More recently, Dees and Lowenbach have reported an unusual type of EEG containing occipital dysrhythmia in a high percentage of children with allergic conditions who have no other demonstrable disorder of the central nervous system. Psychotic and neurotic patients are known to have an unusually high incidence of abnormal EEG's and the presence of abnormal EEG's in children with behavior disorders but no other demonstrable pathology within the nervous system has been reported by many authors over a period of about 10 years. A similar high incidence of abnormal EEG's has been found among the children who are patients on the psychiatric wards of Bellevue Hospital. The records of these children who had neither signs nor symptoms of any other disorder of the nervous system and no history suggesting epilepsy have shown between 60 and 70 percent abnormal EEG's whereas the incidence among normal children is said to be between 10 and 15 percent.

It has been shown by Lennox, Gibbs, and Gibbs that the members of the families of epileptics have a high incidence of paroxysmal abnormal EEG's which resemble those seen in epileptics although such individuals never develop clinical signs of epilepsy. Dees and Lowenbach, furthermore, report that those allergic children who have a familial history of allergy have the highest incidence of abnormal EEG's. These studies together with the fact that there was some evidence of familial prevalence of psychologic instability in the families of the patients with disorders of behavior led to the present investigation of the nature of the EEG patterns of the siblings and parents of a group of children with disorders of behavior. This matter has been investigated before by Gottlieb, Ashby, and Knott who found evidence of a hereditary determinant of behavior on comparing the EEG's of 58 patients with those of their offspring who had disorders of behavior.

Because there is an effect of age on EEG pattern, especially in children until about the age of 16, it seemed probable that familial resemblances might be better shown by comparing the EEG records of the children who were patients with those of their normal siblings who were near in age. The data reported in this paper have been assembled, comprising the EEG findings on members of 108 families consisting of 131 patients, 119 of their siblings, and 50 of their parents.

Because the percentage of abnormal EEG's in the total normal population is variously estimated as between 8 and 12 for adults and around 15 for children, it is clear that the 137 normal parents and siblings of the group of 95 patients who did not have organic disorders of the nervous system in addition to the

behavior disorders are not a sample of the total population because they showed 40 percent abnormal records. However, this group of 95 patients and their 137 relatives (81 families) should be large enough to be considered as a sample of what might be obtained from any group of patients with behavior disorders and their relatives such as appear in psychiatric hospitals of large cities. As such a sample, it is obvious that this group should be eventually compared with family groups of other social and psychologic status. In the meantime, there are various deductions which may be made, or at least, suggested by the present data. First, this material is perhaps additional evidence that the disorders of behavior from which the patients suffer are not typical of those seen in epilepsy, even in its borderline states. There are no cases in which there is paroxysmal clinical behavior which can be designated as a clinical seizure. There are no such cases in either the parents or siblings from whom records have been taken. Furthermore, the incidence of epileptic relatives is low in this group, only 4 relatives in 4 families being so affected according to the histories obtained. And, finally, the number of abnormal EEG's in the relatives of these patients with pure disorders of behavior is less than half that found in the relatives of the epileptic patients.

There is no evidence from this series which bears out the theory that the EEG's of children with behavior problems are abnormal for the age merely because the records are developmentally retarded and less mature, as is the regressive or retarded behavior of the individual. The characteristics of many of the records are such that they would not be normal for any age. Furthermore, the familial types which appear throughout all ages, and the presence of 45 and 37 percent abnormal records in children and adult relatives, respectively, would indicate little change with regard to this factor.

In these data there is no conclusive evidence that the similarity of EEG pattern found in the family units is inherited, although the present material in conjunction with that on epileptic and allergic children suggests that this is so. But, because the stresses and strains resultant from environment must be relatively similar within a family unit, and because there is evidence that these, by producing anxiety, may alter the EEG pattern temporarily and perhaps permanently, it is probable that environment as well as heredity may influence the familial patterning of cortical electrical rhythms.

In this series the records of the parents and siblings which were abnormal seemed to have the same sort of dysrhythmia and capacity for change of pattern which is characteristic of the high degree of sensitivity found in the EEG's of the patients and which has been observed in the records of adult psychiatric patients also. In the latter, it has been demonstrated that those records which are irregular and reactive to hyperventilation preceding shock therapy are those most altered by the treatments. This has been shown in another way by Pacella and Berrera who found epileptic seizures developing after shock treatments in certain patients, all of whom had abnormal paroxysmal EEG's preceding shock, but who had no previous clinical seizures.

A familial EEG sensitivity as well as one of individual patients is thus demonstrated. This is reasonable, because it is known that normal individuals also have wide variations in the capacity of their nervous systems to react to external stimuli. Reactivity of this sort is decidedly greater in infants and young children, for instance, than in adults, as shown by EEG findings. It is manifest clinically by the onset of convulsions in response to changes in blood sugar or to various metabolic stimuli. It is very probable that the autonomic system is implicated in this reactivity because its changes are known to affect the EEG directly, and because clinical observation suggests that autonomic imbalance exists in many patients with psychologic disorders.

With these data in mind, it is possible to conceive of the patterns of the electroencephalogram as being organized and influenced in somewhat the following manner: there is one type of EEG - in the group having organic disorders of the nervous system in addition to behavior disorders - which is notably unstable, as demonstrated characteristically by a paroxysmal pattern, often containing spike potentials in which the paroxysmal quality is usually accentuated by hyperventilation. Clinically, its manifestations are true epileptic seizures of one sort or another. Both the paroxysmal clinical pattern and that in the EEG's is as marked in the adult as in the child. Their asymptomatic relatives have a very high incidence of abnormal EEG's, containing many of the same paroxysmal characteristics.

There is a second group - behavior disorders with no organic nervous system disorders - whose records during childhood also show extreme sensitivity to environmental stimuli such as hyperventilation. These records are dysrhythmic and have marked fluctuations in pattern, but without the signs of increased cortical electrical activity such as are indicated in the records of the first group by spike potentials. This second group has, clinically, disorders of behavior, tension, and anxiety states without trace of motor epilepsy and without demonstrable abnormality of the central nervous system elsewhere. The pattern of the EEG appears to be familial here, also. In this latter group, there is some evidence of a relationship between a familial tendency to psychologic instability as demonstrated clinically by tension and anxiety states, neuroses, and schizophrenia, and the reactivity and consequent instability of electrocortical potentials as demonstrated by the electroencephalogram. (Psychosom. Med., May-June '49, M. A. Kennard)

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A Virus Isolated from Patients Diagnosed as Nonparalytic Poliomyelitis or Aseptic Meningitis: Following a report by Dalldorf and Sickles, the authors sought and isolated a virus from patients with an illness resembling nonparalytic poliomyelitis which occurred during 1948 in southern New England. This virus is apparently similar to that which Dalldorf and Sickles obtained from the feces of 2 patients diagnosed as paralytic poliomyelitis, and like their agent, the virus

infected newborn albino mice and produced in them weakness and paralysis accompanied by diffuse myositis.

During the summer and fall of 1948 samples of feces were collected from 16 representative patients from Connecticut and Rhode Island, 13 of whom presented clinical features consistent with nonparalytic poliomyelitis, and 3 of whom had definite muscle weakness and were diagnosed as paralytic poliomyelitis. The fecal samples from these 16 patients were tested in monkeys for poliomyelitis virus and were also examined for the agent infectious for newborn mice. Fecal samples from 5 of the 13 patients with nonparalytic illnesses produced disease in newborn mice, but not in monkeys. From one to 4 rhesus monkeys (Macaca mulatta) were used to test each of these samples for poliomyelitis virus with negative results. Furthermore, the strains recovered in newborn mice were tested in 8 additional monkeys and again the results were negative. The new virus was also found in the feces of 2 patients diagnosed as fever of unknown origin. Lumbar puncture was done in only one of the latter patients and there was no pleocytosis. The new virus has not been recovered by blind passage of brains of normal newborn mice, nor from separate fecal samples of 29 patients in New Haven with various other infectious and noninfectious diseases.

Fecal samples from 2 of the patients with nonparalytic disease yielded poliomyelitis virus when inoculated into monkeys, but did not produce disease in newborn mice. The 2 strains of poliomyelitis virus were typical; they were pathogenic for monkeys but not for cotton rats or mice (3-week old as well as newborn). Samples of feces from the 3 patients with clinical paralytic poliomyelitis failed to yield an agent when tested in either monkeys or newborn mice.

Tests for neutralization of the new virus with acute and convalescent sera of patients revealed that (1) the sera of 7 patients from whom the new agent was isolated, neutralized the virus (neutralization index from 1,000 to 10,000) in the convalescent stage and to a lesser degree in the acute stage, (2) the convalescent sera from 5 other patients with nonparalytic illnesses also neutralized the virus, (3) the convalescent sera of the 3 patients diagnosed as paralytic poliomyelitis and the sera of the 2 nonparalytic patients from whom poliomyelitis virus was isolated, all failed to neutralize the virus. The results of complement fixation tests with sera from these patients indicated that mumps virus was not the etiological agent of their illnesses.

Preliminary data on sedimentation suggest that the agent is one of the smaller viruses. Thus, although some of the virus may be thrown down together with the particles which sediment at 18,000 r.p.m. for 30 minutes (6-inch rotor), most of the virus remains in the supernatant fluid. It may be sedimented readily at 36,000 r.p.m. for 60 minutes.

Samples of feces collected from different parts of the country and frozen since collection were also examined for the virus. It was not found in pooled specimens collected during 1944 from patients with paralytic poliomyelitis in New York City, nor from similar specimens collected from patients in Los Angeles, California, in 1948. These pooled samples were proven by monkey inoculation to contain poliomyelitis virus. The new virus, as well as poliomyelitis virus, was isolated from pooled fecal samples of 6 patients who had nonparalytic poliomyelitis in 1947 in Akron, Ohio. Both viruses were also present in pooled fecal samples collected in 1948 from patients with paralytic poliomyelitis in Winston-Salem, N. C. An ultracentrifuged concentrate of the Winston-Salem specimens had titers of 10^{-3} for poliomyelitis virus in monkeys and of $10^{-3.5}$ for the new virus in newborn mice.

The virus has been sought in samples of the sewage from 6 cities, 3 situated in Connecticut (Hartford, Norwalk, New Haven) and 3 in North Carolina (Greensboro, High Point, and Winston-Salem), and in nonbiting flies trapped in 2 of these cities. In the summer of 1948 mild poliomyelitis appeared to be prevalent in Connecticut, and a severe epidemic of classical poliomyelitis occurred in North Carolina. As already mentioned, the new virus was isolated from patients in both areas. The new virus was found in the sewage of all of the above 6 cities during some part of the summer and fall of 1948 and usually several serial samples from each city were positive. Serial sampling during the winter has for the most part been negative but the data are too few to indicate whether the occurrence of the virus in sewage follows the seasonal pattern of poliomyelitis virus.

Tests of flies from the above areas for the presence of the new virus have not yet been completed, but thus far 2 isolations have been obtained, one from flies trapped in August 1948 in Hartford, Connecticut and another from flies trapped in July 1948 in High Point, N. C. In addition to studying this material from Connecticut and North Carolina, flies from Texas were also examined. These were trapped serially in 1948 during an epidemic of poliomyelitis in the lower Rio Grande Valley. From some batches of flies, separated according to species, both the new virus and poliomyelitis virus have been isolated. Other batches of flies have yielded either one virus or the other, and many batches have yielded neither virus. The species of flies which have given positive tests for both viruses are (a) Musca domestica, (b) Phaenicia sericata and P. pallescens, and (c) Sarcophagula and Sarcophaga spp. The 2 viruses (poliomyelitis and the new virus isolated in mice) even when obtained from the same batch of flies do not appear to be related by the tests thus far used (host range and virus neutralization by hyperimmune sera).

By means of cross neutralization tests, it has been found that 2 strains of the new mouse infecting virus isolated from patients in New Haven are related to each other as well as to a strain isolated from Hartford sewage. Furthermore, a strain from Texas flies was found to be related to a North Carolina

sewage strain, but not to the Connecticut strains. Thus each strain was readily neutralized by homologous hyperimmune sera, but antisera against Connecticut strains failed to neutralize the Texas virus, and, in similar fashion, Texas antisera had no effect on the Connecticut virus.

Subclinical infection may be produced in chimpanzees by oral administration of the new virus. One of the physicians engaged in work with this agent developed a vague febrile illness of 8 days' duration which was diagnosed as fever of unknown origin. The only suggestion of involvement of the central nervous system was minimal stiffness of the back; a spinal tap was not done. Virus was recovered from the feces and nasopharyngeal washings during the acute illness. Neutralizing antibodies were not found in serum collected before or during the early acute phase of illness, but appeared in increasing titer during convalescence. The neutralization index on the forty-third day after onset of illness was 10,000. (Proc. Soc. Exper. Biol. and Med., July '49, J. L. Melnick et al.)

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A New Intramuscular Preparation of Quinidine (Quinidine Gluconate):

The intravenous preparations of quinidine which are available are quinidine hydrochloride and quinidine lactate. The authors, who have had limited experience with the intravenous preparations, have had a rather extensive experience with the intramuscular preparations of quinidine over a period of years. They have found the intramuscular method to be a satisfactory and a relatively safe one for administration of this drug. Sagall, Horn, and Riseman have shown that following an intramuscular injection of 5 grains of quinidine hydrochloride, a definite response is observed in 15 minutes and occasionally in 5 minutes. The maximum effect of the quinidine injected intramuscularly was obtained in one and one-half hours. As far as the authors are aware, the only intramuscular preparation at present available is that reported by Sturnick, Riseman, and Sagall, in which quinidine hydrochloride is buffered with urea and antipyrine. The authors have found this preparation to be quite satisfactory. However, in some of the lots which the authors have had prepared, the salt has settled out, and some of the injections have been painful.

The authors have recently used quinidine gluconate for intramuscular injection and have found the results obtained to be quite satisfactory. The formula for this preparation is $C_{20}H_{24}N_2O_2.C_5H_6(OH)_5COOH$. The molecular weight is 520.55; it contains anhydrous quinidine 62.3 percent and gluconic acid 37.7 percent. It occurs as a white, dextrorotatory powder which is soluble in 9 parts of water. The solution is neutral or slightly alkaline in reaction.

This preparation has been used by the authors in various conditions of the heart in 15 patients, some of whom received as many as 10 injections of 150 mg. at varying intervals. The advantages of this preparation are that the

solution is stable, the preparation is relatively simple in type, it results in no irritation at the site of the injection, and the administration of other compounds (for example, antipyrine, the action of which may be unwanted and undesirable) is not necessary. Characteristic quinidine effects were obtained clinically; these consisted of abolition of ventricular extrasystoles, slowing of the auricular rate in auricular fibrillation, and the production of characteristic changes in the T waves and Q-T intervals in patients with normal sinus rhythm. The authors have obtained observable effects within 15 minutes following the injection of a dose of from 5 to 7 and 1/2 grains of the drug.

The intramuscular route of administration is suggested for those patients in whom a rapid effect is required or in whom administration of the drug by the oral route is not considered feasible. (J. Lab. and Clin. Med., Aug. '49, S. Bellet and J. Urbach)

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A Note on Giemsa Stains: At the 16 April meeting of the Biological Stain Commission the Board of Trustees voted that hereafter Giemsa stain will be certified in 2 varieties, namely, "Giemsa stain, Azure B type, for malaria and blood work" and "Giemsa stain, Azure A type, for hematology and bacteriology".

The Azure B type closely resembles tinctorially and spectroscopically the Grubler and Hollborn Giemsa stains of the 1930's and is the variety especially recommended to give the faintly greenish blue tint to parasite cytoplasm which contrasts well with the grayish or greenish blue background of the thick film stained at pH 7.0. This is recommended by many malariologists for thick film work. The Azure A type gives darker red chromatin stains, grayer or more violet blue lymphocyte cytoplasm, and perhaps somewhat heavier staining of micro-organisms. Its useful life is probably shorter under average tropical storage conditions. It is preferred by many American hematologists. (Am. J. Trop. Med., July '49, R. D. Lillie)

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The Reaction Produced in the Pulmonary Arteries by Emboli of Cotton Fibers: In the routine examination of sections of lungs from necropsies over a period of 20 years, the authors have observed, as an incidental finding in 6 cases, foreign bodies in the smaller branches of the pulmonary arteries. These foreign particles were slender and had a faintly greenish tinge; they did not stain with the dyes used in routine histologic preparations and were doubly refractive. They did not cause thrombus formation. The foreign bodies usually lay against the intimal surface of the artery and in some instances a few large mononuclear cells and several multinucleated giant cells of the foreign body type had collected about them.

When the histories in these cases were studied, it was found that there was one feature common to all; each patient had received either one or more

intravenous injections of physiologic saline or glucose solution or blood transfusions, within a period of not more than 10 days prior to death. The foreign particles were considered to be fragments of cotton that were contained in the solution injected and that had come either from the gauze through which the solution had been filtered, or from particles of a cotton stopper that adhered to the mouth of the flask. The lack of thrombus formation about the cotton fibers when they lodge within the lumen of the vessel is a striking feature, true in both the experimentally injected animals and in the human beings.

When cotton fibers are injected into the iliac veins of rats and lodge in the pulmonary arteries, foreign body granulomas are formed. These granulomas in the larger branches of the arteries undergo organization. In arteries of medium size, arterioles, and precapillary branches, the granulomas distend the lumina and often escape through defects in the walls. The defect in the vessel wall is produced by penetration of the cotton fiber through it and also by actual tearing of the wall. The gap is at first filled with fibrous tissue; later some smooth muscle and frequently a new elastica interna are formed. The scar is covered by endothelium. The lumen is again patent after the granuloma has escaped. Some of the cotton fibers ultimately come to lie in alveolar spaces and are surrounded by foreign body giant cells. There is no thrombosis nor hemorrhage associated with these granulomas, nor does the process lead to infarction of the lungs. (Am. J. Pathol., July '49, W. C. Von Glahn and J. W. Hall)

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Study of Radioactive Iodine and the Thyroid: The function of the thyroid gland can be regularly lowered by one or more doses of radioactive iodine. When dosage is properly controlled, no toxic or injurious effects are caused by such treatment; transitory sore throat has occurred in a few patients. A persisting state of hypothyroidism has been induced in 16 patients who were disabled by angina pectoris or congestive heart failure and who failed to respond satisfactorily to all standard forms of medical treatment. In 5 of 9 patients with angina pectoris their pain has been strikingly lessened or abolished, and several have been rehabilitated and are gainfully employed. Alleviation of breathlessness and increased ability to work have been noted in 4 of 7 patients with congestive heart failure. If the patients become distressed by the symptoms of marked thyroid deficiency, the condition can be ameliorated by small doses of thyroid substance. A few patients who showed no worthwhile improvement have been restored to pretreatment status by appropriate doses of thyroid in pill form given by mouth. The heart pain then returned. This treatment is still in the investigational stage; final evaluation must await prolonged study on many patients by various investigators in different clinics.

Radioactive iodine was also used in the treatment of approximately 60 patients with Graves' disease, many of whom had had a recurrence of their disease following surgical operations. In some patients, the presence of other

diseases made them poor risks for surgery. The clinical improvement observed in the group of 60 patients has been gratifying and is in accordance with observations of others. A group of patients with cancer of the thyroid, in some of whom the cancer has spread to other parts of the body, also have been treated with radioactive iodine. In some of these patients, the results have been promising. Further studies are being made to increase the effectiveness of this form of treatment. (Proj. NR-171-294, ONR, Navy Dept., Progress to 30 June '49, H. L. Blumgart and S. Hertz, Investigators, Harvard University)

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Germ-Free Animals: The first litters of germ-free mammals (rats) ever carried to maturity or giving birth to a litter were reported in 1946. In 1948, the second generation of bantam chickens was hatched from eggs laid by germ-free parents. This was accomplished on purified rations. More recently litters from rats and many fertile eggs from germ-free hens have been obtained. These results indicate that germ-free colonies of at least these 2 species can be reared.

The absence of bacteria does not affect the general body growth, hemopoiesis, or conditions leading to maturity of the organism, nor does it affect the state of development of the brain, heart, lungs, spleen, ovary, thymus, or adrenals. Differences were found in those organs which normally come into contact with bacteria such as the intestinal tract and its associated lymphoid organs. In germ-free animals, the small intestine weighs less and is shorter in length. There are fewer wandering and lymphoid cells in the wall of the gut of germ-free birds; their livers weigh less, but there are no structural discrepancies. The amount of cecal content in chickens shows no difference. This is in contrast to the usual findings with germ-free mammals, where the cecum is larger than normal, and is regarded as another indication of normality. There is definitely less lymphoid tissue in structures, such as the cecum and tonsil, normally in contact with bacteria. The spleen and thymus are not different. The blood shows diminished lymphocyte count but is otherwise no different. There is less peribronchial lymph tissue in the lungs of germ-free birds. From this survey, it can be shown for the first time that contrary to opinion derived from the study of germ-free mammals, the lymphatic system of germ-free birds is not equally affected in all parts of the organism.

Meningeal granulomatosis (jitters) appears in certain strains of germ-free chickens but never in contaminated controls hatched from the same clutch of eggs. The symptoms are characterized by coarse general tremors, ataxia, and extreme irritability. The disease is characterized pathologically by meningeal proliferation localized chiefly in the occipital region. This proliferation tends to grow into the underlying brain tissue and causes serious structural derangement. The disease apparently passes from germ-free chick to germ-free chick, but not to contaminated animals. Further studies are continuing in an effort to isolate the causative agent. It is quite possible

that this is an entirely new phenomenon, i.e., a virus principle which is non-symptomatic in the presence of bacteria. This has wide implications. The most recent studies confirm the general outline of the disease and extend investigations on cross transfer and serology.

Some recently contaminated germ-free chickens have shown at post-mortem examination a very specific endocardial lesion. This lesion is caused by the development of granulation tissue on one or more of the valves. This growth eventually destroys the valve itself and causes all of the symptoms of valvular insufficiency. Histologically the granulation consists of connective tissue proliferation with a marked absence of wandering cells. The contaminants in these cases have been Bacillus subtilis, Alcaligenes faecalis, and staphylococcus. Because these lesions have been found only in recently contaminated chickens, and in one instance the organism was isolated from the lesion itself, it is assumed that these contaminants were the etiological agents. Apparently the animal must be at least 4 weeks old and then contaminated for at least 3 weeks in order for the lesion to form.

It has been established that germ-free chickens will grow and develop as well or better than control chickens when fed a highly purified ration to which all presently known vitamins have been added, together with liver and yeast. The addition of liver and yeast as a source of unknown vitamins produced no measurable effects. This might indicate that intestinal micro-organisms are of no help and do not produce added stimulants when a complete diet is fed.

An interesting series of observations has confirmed the fact that the feces of germ-free birds contain about the same amount of vitamins as are fed in the diet. Moreover, the feces of germ-free birds have the same gross chemical composition as the feces of contaminated controls. (It has been a common observation that normal feces are made up of from 50 to 75 percent of dead bacteria and residue.) That residue should exist in germ-free animals fed completely digestible rations needs explaining.

Germ-free chickens did not show any presence of serum antibacterial antibodies up to the age of 170 days. However, at the age of approximately one year, antibacterial antibodies could be demonstrated. The antibodies are formed against the same type of organisms found in the ration before sterilization. Because these same organisms are present in small numbers as dead cells in the autoclaved ration, they eventually stimulate antibody production in a manner similar to the body response to oral vaccines. The slow response is probably caused by the low concentration of organisms and the probably low antigenicity of the autoclaved cells. Control animals show antibacterial antibodies against organisms in their intestinal tract at the age of 30 days but not at from 10 to 15 days. Natural antibodies are present against foreign erythrocytes at the age of 30 days but not at 15 days in both germ-free and control chickens.

The analysis of rat milk from 0 to 24 days' lactation has been made for protein, fat, carbohydrates, and ash. Unlike other mammals in which the colostrum and early milk is high in protein and low in fat, the colostrum and early milk of the rat is high in fat (22 percent) and the protein level (9 percent) is no higher in the colostrum than in the milk.

Most of the new-born, hand-fed rats starve and lose weight for from 3 to 5 days despite being fed a highly nutritive liquid diet hourly. This has not been overcome in spite of parenteral injection of protein hydrolysates, amino acids, glucose, salts, and vitamins. Hand-fed, caesarean-born rats need vitamin C for survival. Recent studies show that the total vitamin C content of germ-free rats decreases (in normal suckled animals, there is an increase) despite the fact that there is ample vitamin C in the diet and the vitamin C content of liver of germ-free rats is higher than stock colony rats at this early age; in normal suckled animals there is an increase in total vitamin C. Concerning the B vitamins, the liver values indicate that germ-free rats have adequate absorption and storage of vitamins. The supply of vitamins found in muscle would indicate that mobilization of vitamins in the liver is adequate. It is especially interesting that there are approximately the same quantities of B vitamins in the ceca and that they do not originate via bacterial synthesis.

As compared with control (contaminated) rats, the adult germ-free rat produces more feces, less urinary nitrogen, and slightly more feces nitrogen, and has less fat in its feces. The total fat retained, however, is as much as in the controls. In general, it seems that the germ-free rat is more efficient in maintaining itself.

Germ-free rats appear to be blank from the standpoint of the presence of natural antibodies against a variety of foreign erythrocytes and bacterial antigens. Whereas both germ-free and control rats failed to show antibodies against foreign erythrocytes, antibodies could be demonstrated against bacterial antigens in control animals but not in germ-free stock.

The collaborative program on dental caries with the Zoller Clinic group has progressed steadily. The first phase is finished. With a diet which produces caries in more than 90 percent of control rats (normally contaminated) no evidence of caries was found in germ-free animals. Some germ-free caesarian-born rats were contaminated with a pure culture of Lactobacillus isolated from caries. In February 1949, one of the infected rats died after only 49 days on the diet and at 75 days of age. Examination of the molars indicated definite disintegration of the enamel. These are the first such lesions observed in any germ-free or germ-free subsequently-contaminated rat. (NR-130-067, ONR, Navy Dept., Progress to 30 June '49, J. A. Reyniers, Investigator, Univ. Notre Dame)

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Tropical Diseases in the Navy and Marine Corps in the Postwar Period: During World War II, with the large numbers of personnel in the South Pacific, Southwest Pacific, and Central Pacific areas, the incidence of tropical diseases assumed an important role in Navy and Marine Corps morbidity. With the cessation of hostilities and withdrawal of the greater part of the military forces from these areas, it was considered of interest to study the effect of tropical diseases during the postwar years. Data, therefore, were compiled from the Fa-card (Individual Statistical Report of Patient) for the years 1946 through 1948. There were reported 3,298 cases of malaria (exclusive of induced), 4,632 cases of acute infectious jaundice, and 2,041 cases of acute hepatitis. There were also 5,063 cases of dysentery and chronic diarrhea. The accompanying table indicates this incidence and the annual rate per 100,000 strength in comparison with the combined figures for World War II.

PRINCIPAL TROPICAL DISEASES
NAVY AND MARINE CORPS
1942 - 1945 AND 1946 THROUGH 1948

DIAGNOSIS	1942-1945		1946		1947		1948	
	Incidence	Rate per 100,000	Incidence	Rate per 100,000	Incidence	Rate per 100,000	Incidence	Rate per 100,000
Malaria	113,744	1,141.2	2,562	193.3	553	94.2	183	36.0
Dengue	37,663	377.9	45	3.4	11	1.9	5	1.0
Dysentery Bacillary	19,996	200.6	2,481	187.2	840	143.0	380	74.8
Hepatitis 1/	20,686	207.6	3,584	270.4	1,577	268.5	1,512	297.6
Filariasis	12,040	120.8	48	3.6	15	2.6	9	1.8
Hookworm	7,209	72.3	522	39.4	191	32.5	204	40.2
Dysentery, unclassified	3,991	40.0	306	23.1	79	13.4	83	16.3
Diarrhea, chronic	1,632	16.4	171	12.9	52	8.8	35	6.9
Dysentery, amebic	1,626	16.3	266	20.1	132	22.5	238	46.8
Typhus, scrub	613	6.2	5	0.4	1	0.2	3	0.6
Encephalitis 2/	506	5.1	81	6.1	23	3.9	33	6.5
Typhus	413	4.1	27	2.0	3	0.5	1	0.2
Sandfly fever	239	2.4	2	0.2	-	0	1	0.2
Abscess, amebic, liver	67	0.7	18	1.4	10	1.7	5	1.0
Schistosomiasis	55	0.6	4	0.3	1	0.2	2	0.4
Yaws	26	0.3	11	0.8	3	0.5	4	0.8
Relapsing fever	22	0.2	1	0.1	1	0.2	-	0
Leishmaniasis	16	0.2	3	0.2	-	0	-	0

1/ Includes hepatitis, acute and acute infectious jaundice.
2/ Includes encephalitis acute and lethargic.

In addition to those diseases listed in the table, there have been isolated cases of certain other exotic conditions reported during the period 1946-1948, which though normally of low incidence, could become serious problems. Some of these conditions have a fairly high case fatality rate; others are important principally for epidemiological reasons. These included one case of trench fever in 1946, 2 cases of bartonellosis (one in 1946 and one in 1947), one case of onchocerciasis in 1947, and one case of leprosy in 1946. There were no cases of trypanosomiasis, dracontiasis, or loiasis reported during this period although several isolated cases did occur during the war years. There were no cases of plague, yellow fever or cholera observed during or since World War II.

Some of the conditions generally included in the category of tropical diseases are also endemic to a degree in temperate climates. These include such conditions as hookworm, dysentery, and diarrhea. Thus, notwithstanding such precautionary measures as are taken, a varying degree of incidence for these conditions exists among personnel of the Navy and Marine Corps.

Malaria, having reached a high incidence rate of 2,690.6 per 100,000 strength in 1943, dropped sharply in 1944 and 1945 and has since continued in a steady decline to a new low of 36.0 in 1948. This is approximately one third the rate in 1941, just prior to World War II. The incidence of hookworm in 1942 reached a high of 429.2 per 100,000 and was accounted for almost entirely by EPTE cases; it dropped to 29.5 in 1943 with few EPTE's and has continued at approximately that level since, with the proportion of cases of this disease classified as EPTE remaining under 10 percent. Among the diseases listed in the accompanying table it will be noted that such conditions as dengue and filariasis, among others, have reached the stage of being almost isolated cases. In bacillary dysentery the incidence during the war years increased until 1945, then sharply reversed itself in 1946, going from a high of 305.4 per 100,000 in 1945 to 74.8 in 1948. However, amebic dysentery which ranged between 10.9 and 16.8 per 100,000 strength during World War II has increased since 1945, reaching a rate of 46.8 per 100,000 average strength in 1948, almost 3 times as high as the peak during the war.

Of some significance is the trend evidenced in encephalitis. The incidence shown includes both acute encephalitis and encephalitis lethargic; however, it was noted that most of the cases are reported as acute encephalitis. Since the close of the war the incidence rate for these conditions has tended to rise slightly and is recorded as 6.5 per 100,000 average strength in 1948.

Of particular interest is the incidence of acute infectious jaundice and acute hepatitis in the postwar period. More than 6,500 cases were reported for these conditions during the past 3 years. The incidence rates during these years were well above those for any of the war years. By 1948 the annua incidence rate had reached 297.6 per 100,000, almost 25 percent over that for 1943 which was the highest for the war period. (Statistics of Navy Medicine for September 1949)

Skin Cleansers for Industry: The frequent use of mild industrial cleansers does not permit irritants to remain on the skin for long periods and hence lessens the likelihood of dermatitis. However, the frequent or even infrequent use of harsh or improper skin cleansers may cause dermatitis, especially in workers with soap-sensitive skins. Young swarthy workers with oily skin can withstand the action of much harsher cleansers than can the older workers with thin dry skin. This is because most cleansers, in general, tend to defat the skin, and alkali cleansers, in particular, also tend to soften and remove the horny layer of the skin. In Ohio in 1947 and 1948 about 7.5 percent of all reported occupational dermatitis was caused by industrial soaps. This does not take into account the many cases of unreported industrial dermatitis caused by the pernicious habit of some workers who use harsh cleansers, such as abrasive soaps with high-alkaline content and even powerful solvents, to remove quickly tenacious grime and grease from their hands. Varsol, Stoddard solvent, carbon tetrachloride, and even benzol have been or are still used for hand cleansers by some misguided workers. Dermatitis from these harsh cleansers is sometimes mistakenly attributed to other industrial causes.

In choosing industrial cleansers, the industrial physician or safety director should know how to select the cleanser which is least harmful to the skin and yet can efficiently remove the obnoxious soil from the skin. It is often necessary to use different cleansers in various parts of the same plant to remove certain types of soil, and it may be necessary to use different cleansers on different types of skin to remove the same soil.

Various chemicals may be added to soaps to increase their detergent action. Sodium carbonate, trisodium phosphate, sodium silicate, and sodium borate are some of the alkalies which increase the detergency of soap; but they also increase the potential irritant properties of soaps. Water softeners such as sodium hexametaphosphate and tetrasodium pyrophosphate are added to soaps to permit them to act in hard waters.

Soaps and other cleansers not only emulsify foreign fat on the skin but also emulsify the sebum, cholesterol, and skin fat, thus defatting the skin. This is especially so when soaps are excessively used on dry and senile skin, which is already deficient in fat and oil. The prolonged action of alkali in soaps softens and loosens the superficial keratin or horny layer of the skin and thus renders the skin more permeable to irritants. Some skins may also become allergic to certain fatty acids and their salts, which are the basic soap ingredients.

Industrial cleansers may be classified into (1) soaps, (2) sulfonated oils, and (3) synthetic detergents. The majority of workers can safely use soaps which constitute by far the largest proportion of industrial cleansers.

Soaps may be classified as hard, soft, antiseptic, and indicator. Hard soaps are sodium salts of tallow, coconut oil, olive oil, other vegetable oils,

rosin, or mixtures of these. They are popular as toilet soaps and are pressed into cake form. Workers like toilet soaps, especially if the soaps are perfumed, superfatted, and dyed, but they are expensive and uneconomical for industrial use. Because some workers will not use another's cake of soap, they are furnished individual soap cakes. There is considerable waste because small pieces of soap are often thrown away. For these reasons hard soaps are seldom used for industrial purposes where large numbers of workers are employed. Powdered soaps are more economical and constitute a large portion of industrial cleansers. Powdered industrial soaps consist principally of a powdered hard soap, a ground scrubber, and a water softener. The sodium coconut oil soap lathers well. The corn meal scrubber may be ground coarse or fine, as desired. The water softener and synthetic detergent enable the cleanser to be used with hard water. The superfat tends to make the action of the soap milder on the skin.

Liquid soaps are probably the most frequently used types of industrial cleansers. They consist of a potassium coconut oil soap, a water softener, and water. Workers seldom object to liquid soaps, although they are less mild than the powdered soaps. Antiseptic soaps are currently popular. Phenolic compounds such as G 11, santophen 1, and octyl resorcinol are added in order to increase the antiseptic properties of soap. A potassium coconut oil soap to which from one to 2 percent of these compounds is added is said to diminish the bacterial flora of the skin upon repeated washing much more than repeated washing with the soap alone. They may have considerable value in the prevention of folliculitis, furuncles, and infected acne lesions occurring in workers exposed to cutting oils, petroleum oils, and heavy coal tar distillates. Some of them also have deodorant properties. Indicator soaps have been made which contain an indicator showing a color change as long as there are traces of the irritant remaining on the skin. The first of these was a soap devised by Norwood containing 5 percent potassium sulfite in liquid soap which shows a pink color as long as tetryl or TNT is on the skin. The second devised by Mason and Botvinick is one which shows a purple color as long as traces of fulminate of mercury are on the skin.

The sulfonated vegetable oils. Sulfonated castor oil has long been used in textile dyeing under the name of Turkey Red oil (an emulsion of a partially sulfonated castor oil and neutral soap). Other vegetable oils are being sulfonated and used as industrial cleansers. They act by emulsifying soil on the skin and are especially useful for dry and soap-sensitive skins. They can be made acid or alkaline and can be superfatted by the addition of unsulfonated fatty oils. Their cleansing properties can be increased by the addition of wetting agents. The sulfonated vegetable oils are useful cleansers for inflamed skin, senile dry skins, and for workers whose hands are exposed to the defatting action of petroleum oils and solvents. They do not foam well and workers may object to them for this reason.

Synthetic detergents may be classified as anionic, cationic, and nonionic. The molecules of the synthetic wetting agents are composed of 2 essential

parts. One is hydrophilic and the other is oleophilic, thus enabling the wetting agent to bring together otherwise immiscible water and oil molecules. They may be made acid, neutral, or alkaline, and still be active. They lower the surface tension of the liquids enabling them to spread over a surface and penetrate cracks and pores. Oily and waxy films are made more easily removable because the wetting agents penetrate and emulsify them. The synthetic wetting agents, like soaps, also tend to defat the skin, but they do not dissolve keratin. On the other hand, they are more likely to produce skin sensitivity.

There are hundreds of anionic wetting agents, and they can be made acid or alkaline, as desired. They are seldom used in the pure state for skin cleansing, but are mixed with sulfonated oil soaps or petroleum oils in various proportions. They are useful for removing petroleum oils, greases, coal tar, or synthetic waxes from the skin. This liquid is rubbed onto the soiled skin, and then running water is allowed to wash away the emulsified soil.

The cationic detergents are quaternary ammonium compounds and have considerable antiseptic, fungicidal, and deodorant properties. They are marketed under various trade names and are being sold as antiseptic and fungicidal skin cleansers. Some of them lather well, but their detergent properties are inferior to soap with which they are incompatible. They have a field of use as cleansers for removing cutting oils from the skin and for preventing skin infections. They can be useful for workers engaged in meat handling, vegetable and fruit canning, and other places where antiseptic and deodorant action is desirable. As a class, they possess greater sensitizing properties than the anionic detergents.

Nonionic agents are so named because their molecules do not ionize to any great extent when the material is placed in water. They are largely represented by fatty esters of alcohols, ethanolamines, ethers, and the sulfonated oils and fatty acid amides which have not been neutralized by alkali.

An industrial cleanser should (1) be freely soluble in hard, soft, cold, or hot water, (2) be agreeable to use, (3) remove foreign soil without defatting the skin, (4) not harm the skin if used in moderation, (5) not contain harsh abrasives, (6) not be highly alkaline (above 10.5 pH), (7) be easy to use in cake form or flow easily through dispensers, (8) not deteriorate or become insect infested, (9) not clog plumbing. (Indust. Hyg. Newsletter, Sept. '49, L. Schwartz and D. J. Birmingham)

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Visual Acuity Test for Flight Trainees: The gradual change in visual acuity between the ages of 16 and 23 years is often responsible for candidates reaching Pensacola only to be disqualified because they do not meet the prescribed 20/20 standard. Meanwhile the government has invested a considerable sum of money in enrollment, early training, etc., and in addition the candidate usually experiences a bitter disappointment.

Two things, either separately or in combination, account for the drop in visual acuity subsequent to the candidate's original flight physical examination:

(1) The eye becomes longer and therefore more myopic.

(2) A mild degree of latent myopia, though unchanged, becomes manifest by virtue of loss of resolving power. This loss in resolving power is probably due to the gradual change from the very clear media of youth to the relatively clouded media of the adult. This is a physiological process. Small in degree, it may be just enough to make the difference between qualification and rejection.

Present instructions do not require refraction if the candidate's visual acuity is 20/20 or better. However, when a candidate reads the 20/20 line more slowly than 2 letters per second, refraction should be done if at all possible. Most of these slow readers are myopic. If, under a cycloplegic, the degree of myopia is greater than one half diopter in any meridian the candidate must be disqualified even though he does manage to read 20/20. This requirement was set after considerable experience has proven that all myopia becomes worse with age. If the myopia is greater than one half diopter, defective visual acuity is practically certain - it is just a matter of time. (Aviation Medicine Div., BuMed)

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Opportunity for Civilian Physicians and Reserves for Active Duty with the Naval Air Reserve Training Command: The Naval Air Reserve Training Command, with headquarters at the Naval Air Station, Glenview, Ill., presently offers opportunities for active duty to inactive Reserve medical officers and interested private physicians at several of its Naval Air Stations in various parts of the United States. Duty assignments are available now or in the near future at the following Naval Air Stations: Akron, Ohio; Atlanta, Ga.; Columbus, Ohio; Denver, Colo.; Grosse Ile, Mich.; Lincoln, Neb.; Los Alamitos, Calif.; Niagra Falls, N. Y.; St. Louis, Mo.; Spokane, Wash.; Willow Grove, Pa.; Jacksonville, Fla.; Minneapolis, Minn.; and New Orleans, La.

Those who are accepted for this duty will receive full base pay and allowances for subsistence and quarters commensurate with their rank and, in addition, $100.00 per month will be paid to those who volunteer and agree to remain on active duty for a minimum period of one year, as provided for by Public Law 365 of the Eightieth Congress. A number of billets for duty involving flying are open for qualified flight surgeons and aviation medical examiners. Past military service is also credited for pay purposes.

Any medical officer of the Naval Reserve who is now on inactive duty is invited to submit his request, designating three stations in order of preference. He may also specify the date he desires to begin active duty. Physicians who are not commissioned in the Medical Corps of the Naval Reserve may apply to their nearest Office of Naval Officer Procurement for information pertaining to securing a commission in the Naval Reserve.

Naval Reserve medical officers with the rank of lieutenant commander or below who wish to further their interest in Aviation Medicine may submit their request for the course given at the School of Aviation Medicine and Research, Naval Air Station, Pensacola, Fla. The request should include an agreement to remain on active duty for one year after completion of the course. This ensuing duty may be served at one of the Naval Air Stations of the Naval Air Reserve Training Command if desired.

Inquiries and applications concerning this duty should be addressed to the Chief of the Bureau of Naval Personnel, via the Bureau of Medicine and Surgery, Navy Department, Washington 25, D. C. (Personnel Div., BuMed)

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BUMED CIRCULAR LETTER 49-111 7 September 1949

To: All Ships and Stations

Subj: Aminophylline 0.1 Gm. with Phenobarbital 0.016 Gm. tablets, 1000's IAN #1-059-710.

This letter (copy in Navy Department Bulletin of 15 September) states that addressees are directed to survey and destroy all stocks of subject item bearing certain producer lot numbers and also any stock of subject item bearing other lot numbers which shows varying degrees of yellow to brown spotting, or other discolorations, or yellowing or browning of the cotton filler or an ammoniacal or urea-like odor. It is further stated that supplies of this item will be available in the Medical Supply System within 90 days and that local procurement is authorized to satisfy immediate requirements if existing stock is depleted.

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BUMED CIRCULAR LETTER 49-112 9 September 1949

To: All Ships and Stations

Subj: Instructions for Disposition of Inactive Civilian Personnel Jackets and Industrial Health Jackets.

Ref: (a) Paragraph 12B11.5(c), Item 42 (Advance Change 3-5) and Item 125 (Advance Changes 3-7 and 3-13), Manual of the Medical Department, USN, 1945.
(b) Navy Civilian Personnel Instructions.

1. The inactive civilian personnel jackets and industrial health jackets referred to in references(a) and (b) shall be forwarded together to the Naval Records Management Center, Mechanicsburg, Pennsylvania.

2. These records shall be serviced in accordance with reference (b) which prohibits the unauthorized revelation of medical information in the health jacket. --BuMed. C. A. Swanson

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BUMED CIRCULAR LETTER 49-113 14 September 1949

To: BuMed Management Control Activities

Subj: CPL&D 49-79; Correction to

This letter contains (1) a correction in CPL&D (Civilian Personnel Letters and Dispatches) 49-79 issued by the Office of Industrial Relations of the Executive Office of the Secretary of the Navy, (2) instructions concerning the correction, and (3) states that Chapter R3-17 of the Federal Personnel Manual provides rules for determining qualifications on reassignment in reduction in force. The subject of CPL&D 49-79 is "Responsibilities of Commandants of Naval Districts and River Commands and Commanding Officers of Naval Activities in Placements Relating to Reduction in Force Actions".

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BUMED CIRCULAR LETTER 49-114 14 September 1949

To: All Ships and Stations

Subj: Transportation of Remains of Deceased Naval Personnel

Ref: (a) BuMed CircLtr 49-90; N.D. Bul. 31 Jul 1949, 49-523.
(b) ALSTACON 1618592 dated 16 Aug 1949.

1. References (a) and (b) are hereby canceled. Detailed instructions relative to transportation of remains of deceased naval personnel when death occurs outside the continental United States will be issued in the near future. In the interim, surface transportation should continue to be utilized for movement of remains of deceased naval personnel to the United States. However, in any case where Government air transportation is readily accessible, such may be utilized with the Bureau of Medicine and Surgery being so informed together with information as to the date and time of departure and the place and time of arrival in the United States.

2. When death occurs at a place where facilities for embalming or encasement are not available, transportation by airplane to another overseas military activity, within practicable flying distance, where such services are available, may still be effected through the local command. Similarly, transfer of remains by air to another overseas activity for return to the United States by surface vessel may be arranged locally and the Bureau of Medicine and Surgery so informed.

3. Air transportation for remains of the dead will not be requested or provided within the continental United States. --BuMed. C. A. Swanson

Approved: Dan A. Kimball, Acting Secretary of the Navy

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BUREAU OF MEDICINE AND SURGERY
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